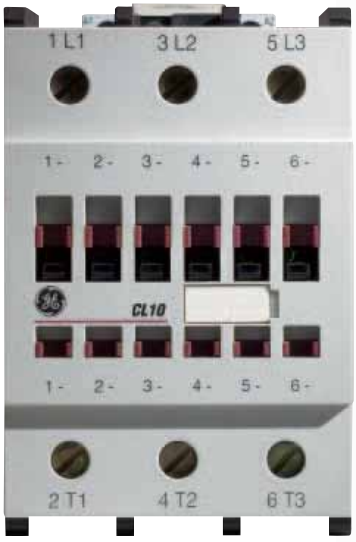
GE Consumer & Industrial
Power Protection

WORLDWIDE PARTNER

Control and Automation

For industrial applications

Everything is under control



GE imagination at work

Control and Automation

A

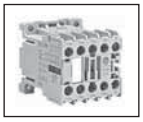
Auxiliary contactors and Plug-in relays

Series PRC - Plug-in relays

Miniature plug-in relays
Standard 8-11 pin plug-in relays

● A.2

Series M - Auxiliary minicontactors



Ith = 16A

● A.16

Series RL - Auxiliary contactors

Ith = 20A

● A.22

B

Motor protection devices

Series SFK -
Motor protection circuit breaker

Thermal and magnetic protection of AC and DC motors
Setting ranges from 0.1 to 25A

● B.2

Surion - Manual motor starter

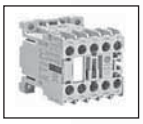
Thermal and magnetic protection - Magnetic protection
Setting ranges from 0.1 to 63A

● B.8

C

Contactors and Thermal overload relays

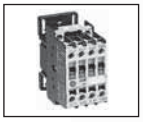
Series M - Minicontactors



3 and 4P (4NO, 2NO+2NC, 4NC) 6,9 and 12A (AC-3)
20A (AC-1)
Control circuit AC and DC

● C.2

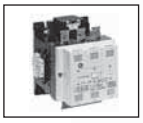
Series CL - Contactors



3 and 4P (4NO, 2NO+2NC)
9 to 105A (AC-3) 25 to 140A (AC-1) AC, DC and with electronic module

● C.10

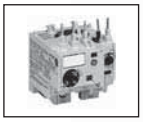
Series CK - Contactors



3 and 4P (4NO) 150 to 825A (AC-3) 200 to 1250A (AC-1) AC, DC and with electronic module

● C.18

Series MTO - Thermal overload relays



For minicontactors series M from 0.11 to 14A

● C.60

Series RT - Thermal overload relays

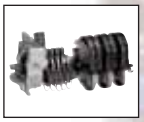
For contactors series CL and CK from 0.16 to 850A
Class 10A, 10, 20, 30

● C.62

Series CSC -
Contactors for capacitors switching

● C.74

Series 390.R - Clapper contactors



● C.80

D

Motorstarters

Coordination

Link modules for mechanical and electrical connection of the manual motor starter and the M/CL contactor ranges

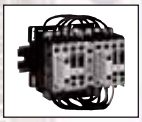
● D.2

Direct-on-line starters

Series M: 6 to 12A (AC-3)
Series CL: 9 to 105A (AC-3)
Series CK: 150 to 825A (AC-3)

● D.18

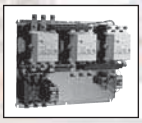
Reversing starters



Series M: 6 to 12A (AC-3)
Series CL: 9 to 105A (AC-3)
Series CK: 150 to 825A (AC-3)

● D.20

Star-delta starters



Series CL
Series CK

● D.22

ASTAT S - Soft starter

Small soft starter with integral by-pass

● D.66

ASTAT SD - Soft starter

Soft starter for 3ph AC motors up to 850 kW

● D.72

ASTATplus - Soft starter

Solid state soft starter for 3ph AC motors up to 850 kW

● D.78

E

Control and signalling units

Series P9 - Panel mounting - Units Ø 22 mm

E.10

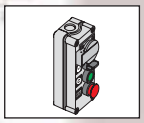
Series P9 - Base mounting

E.25

Series P9 - Push-button stations

E.28

Series P9 - Equipped boxes



E.31

Series P9 - Common accessories

E.34

Series 077 - Units Ø 30 mm

E.48

Series NLT - Light towers

E.76

Series 101 - Palm push-buttons

E.82

Series IP - Foot switches

E.84

Safety foot switches

E.86

Series 105 - Signalling devices

E.87

F

Electronic relays

Series DM - Single voltage relays

22.5mm module
Direct supply voltage
With transformer

F.3

Series NMV - Multivoltage relays

22.5mm module
Direct supply voltage (24-240V AC/DC)
With transformer

F.4

Series D - Single voltage relays

45mm module
Direct supply voltage
With transformer

F.6

Liquid level detectors

45 mm module
With transformer
DIN mounting

F.7

Earth leakage relays

45 mm module
Direct supply voltage
With transformer

F.8

Protection relays

45 mm module
Direct supply voltage
With transformer

F.9

Detection relays

Direct supply voltage
With transformer

F.10

Control and protection relays

F.11

G

Limit switches

Series IS and IM

Metal and Thermoplastic
EN 50041
Positive opening

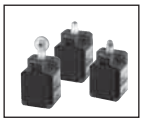
G.2

Series IUG and IUC

Thermoplastic EN 50047
Positive opening

G.4

Series IZ



Thermoplastic miniature

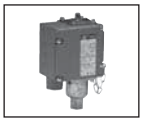
G.6

Series 114FCT

Three pole limit switches
Thermoplastic
Positive opening

G.8

Series 115 - Pressure switches



Bellows type
Piston type

G.16

Safety switches

G.22

Pull rope switches

G.26

H

Speed drive units

VAT20

Single-phase or three-phase digital inverters for controlling the speed of three-phase induction AC motors from 0.2 to 2.2 kW

H.2

VAT200

From 0.4 to 2.2kW at 200V, single phase power supply
From 0.4 to 7.5kW at 200V, three phase power supply
From 0.75 to 11kW at 400V, three phase power supply

H.8

VAT2000

Three phase variable speed drives for AC motors 220-240V or 380-480V power source
0.4 to 315kW in constant torque and up to 370kW in variable torque applications

H.14

AV300i - Adjustable frequency flux vector drive

H.38

I

Main switches

Series ML - standard programme

Main switches and Emergency-stop switches for machinery

I.4

Series ML - enclosed switches

I.7

Small soft starter with integral by-pass

ASTAT S is compact, easy to operate soft starter, designed for use with standard 3-phase squirrel cage motors. It provides an advanced method of reducing current during motor starting and stopping.
ASTAT S will start supplying a reduced voltage to the motor, increasing up to the rated voltage, so avoiding, high currents and generating soft starting and stopping.
The motor has to be able to start in a reduced voltage.

- Solid soft starter for standard 3ph AC motors up to 30kW at 400V AC
- Voltage ratings up to 600V
- Two phase control with integral by-pass
- Compact, small case
- DIN rail mounting. Optional from 31A
- Start and soft stop features

Marking

CE

Technical data

Ratings

Voltage ratings	3ph AC systems 220/230V (+10%, -15%) for units QA02P_ _ _ S 380/415V (+10%, -15%) for units QA12P_ _ _ S 480/500V (+10%, -15%) for units QA22P_ _ _ S 575/600V (+10%, -15%) for units QA32P_ _ _ S
Frequency range	50/60Hz (±5%)
Load	3ph, AC standard motors

Control specifications

Ramp up	0,5 - 10 s
Ramp down	0,5 - 10 s
Initial voltage	0 - 80% Un
Starting torque	0 - 64% Tn

I/O control

Inputs	one input for Start/Stop
Outputs	one output for «End of Ramp» signal for ratings 31, 44, 58A

Ambient conditions

Operating temperature	0 to 40°C. Up to 60°C derating by 1,2% per °C
Storage temperature	-20 to 70°C
Relative humidity	up to 80%, without condensation
Max. altitude	up to 1000m. Above this derate by 5% each 100m
Protection degree	IP20

Order codes ● page D.67
Diagrams ● page D.68
Function ● page D.69
Dimensions ● page D.70

Small soft starter with integral by-pass

Input voltage V CA	Current rating (2) A	Maximum current A	Maximum motor power (1) 220/230V kW / Hp	380/415V kW / Hp	480/500V kW / Hp	575/600V kW / Hp	Cat. No.	Ref. no.	Pack
220	8	28	1.5 / 2	-	-	-	**QA02P008S**	120881	1
	17	60	4 / 5.5	-	-	-	**QA02P017S**	120882	1
	22	77	5.5 / 7.5	-	-	-	**QA02P022S**	120883	1
	31	110	7.5 / 10	-	-	-	**QA02P031S**	120884	1
	44	150	11 / 15	-	-	-	**QA02P044S**	120885	1
	58	200	15 / 20	-	-	-	**QA02P058S**	120886	1
400	8	28	-	4 / 5.5	-	-	**QA12P008S**	120892	1
	17	60	-	7.5 / 10	-	-	**QA12P017S**	120893	1
	22	77	-	11 / 15	-	-	**QA12P022S**	120894	1
	31	110	-	15 / 20	-	-	**QA12P031S**	120895	1
	44	150	-	22 / 30	-	-	**QA12P044S**	120896	1
	58	200	-	30 / 40	-	-	**QA12P058S**	120897	1
500	8	28	-	-	5.5 / 7.5	-	**QA22P008S**	120898	1
	17	60	-	-	11 / 15	-	**QA22P017S**	120899	1
	22	77	-	-	15 / 20	-	**QA22P022S**	120900	1
	31	110	-	-	22 / 30	-	**QA22P031S**	120901	1
	44	150	-	-	30 / 40	-	**QA22P044S**	120902	1
	58	200	-	-	45 / 60	-	**QA22P058S**	120903	1
600	8	28	-	-	-	7.5 / 10	**QA32P008S**	120904	1
	17	60	-	-	-	15 / 20	**QA32P017S**	120905	1
	22	77	-	-	-	22 / 30	**QA32P022S**	120906	1
	31	110	-	-	-	30 / 40	**QA32P031S**	120907	1
	44	150	-	-	-	37 / 50	**QA32P044S**	120908	1
	58	200	-	-	-	55 / 75	**QA32P058S**	120909	1
Accessory	DIN rail mounting kit for types 31A, 44A and 58A						**QAOPTDIN**	120910	1

(1) Ratings for standard 4-poles AC motors
(2) See Operations/hour in table below
Cycles/hour includes both soft start and soft stop

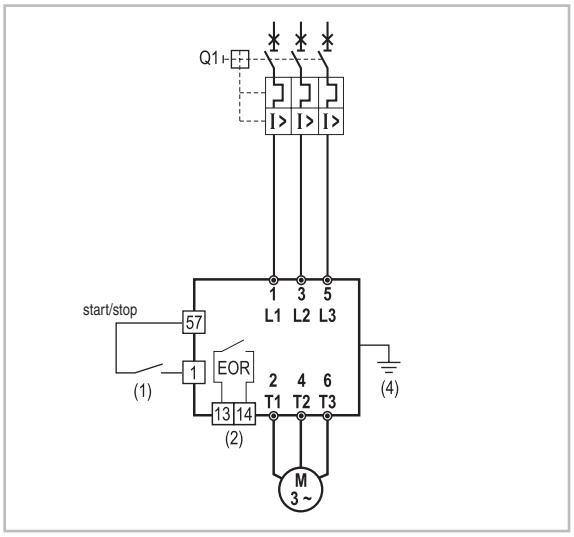
Time between rampings Start/Stop

	Starting current	Ramp 1 sec.	Ramp 2 sec.	Ramp 5 sec.	Ramp 10 sec.
QA_2P008S	8	7	15	35	70
	16	16	33	77	155
	24	26	51	125	250
	28 (*)	32	62	155	-
QA_2P017S	17	7	15	35	70
	34	16	33	77	155
	51	26	51	125	250
	60 (*)	32	62	155	-
QA_2P022S	22	7	15	35	70
	44	16	33	77	155
	66	26	51	125	250
	77 (*)	32	62	155	-
QA_2P031S	31	4	8	20	40
	62	8	15	38	76
	93	12	24	62	124
	110 (*)	15	31	80	-
QA_2P044S	44	4	8	20	40
	88	8	15	38	76
	132	12	24	62	124
	155(*)	15	31	80	-
QA_2P058S	58	4	8	20	40
	116	8	15	38	76
	174	12	24	62	124
	200 (*)	15	31	80	-

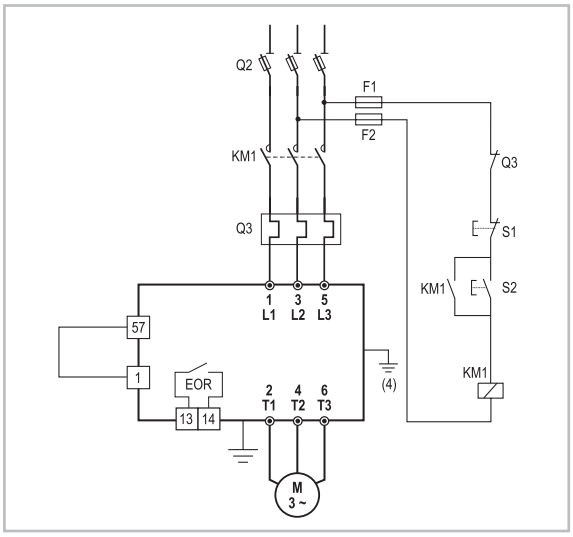
(*) Maximum starting current at all

Diagrams

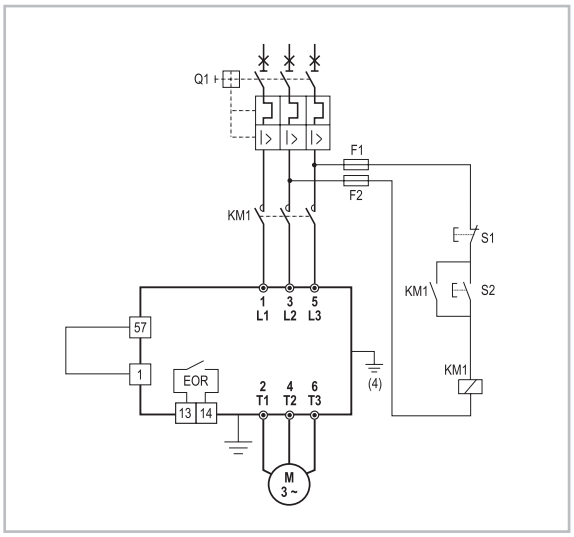
Control by permanent command (soft start and stop)



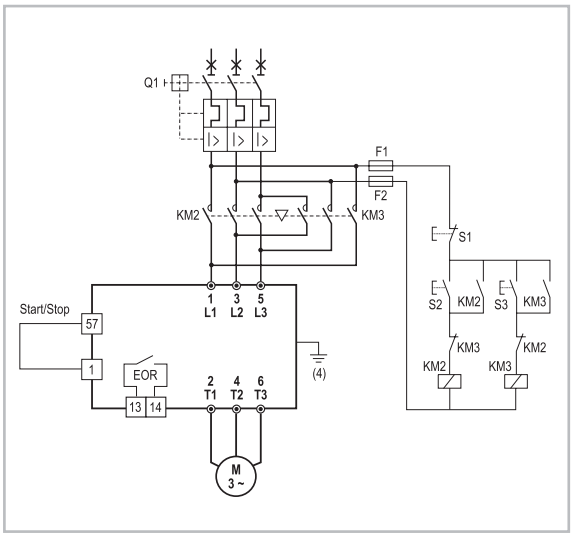
Control by push-buttons, line contactor and thermal overload relay (soft start)



Control by push-buttons and line contactor (soft start)



Forward/reverse control by push-buttons (3)



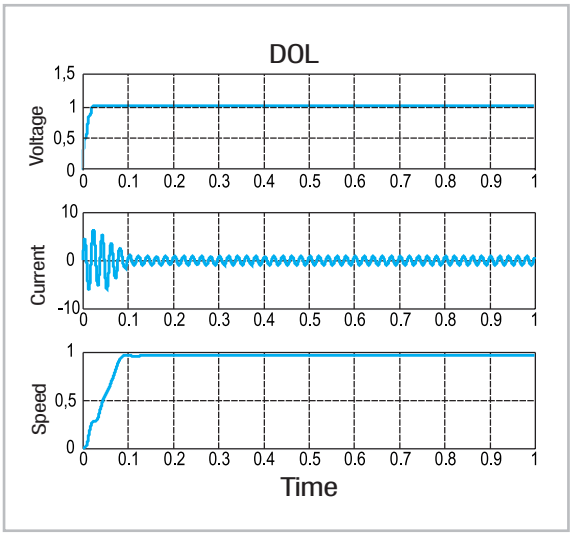
Motor power 380/415V kW	Hp	ASTAT S	Q1	Q2 Am fuses	KM1 Contactor	Q3 Thermal overload relay	F1-F2	S1-S2-S3
4	5.5	**QA12P008**	GPS1B*AK	10	CL25A	RT A 1N	-	P9-P3
7.5	10	**QA12P017**	GPS1B*AN	25	CL25A	RT A 1S	-	P9-P3
11	15	**QA12P022**	GPS1B*AP	32	CL25A	RT A 1T	-	P9-P3
15	20	**QA12P031**	GPS1B*AR	40	CL04A	RT A 1V	-	P9-P3
22	30	**QA12P044**	GPS2B*AT	63	CL06A	RT A 2F	-	P9-P3
30	40	**QA12P058**	GPS2B*AU	80	CL07A	RT A 2H	-	P9-P3

Coordination type 2

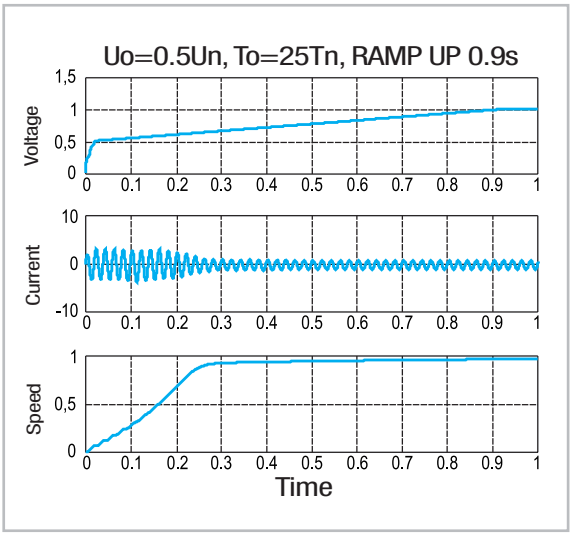
(1) Use dry contact only.
(2) End of Ramp output relay (only types 31A, 44A and 58A.
(3) Forward/Reverse operation must be done when motor is not rotating.
(4) Ground terminal only for types 31A, 44A and 58A.

Performances

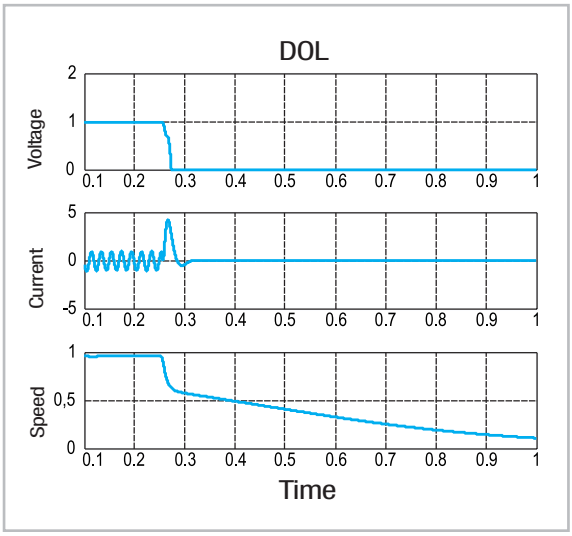
Direct-on-line start



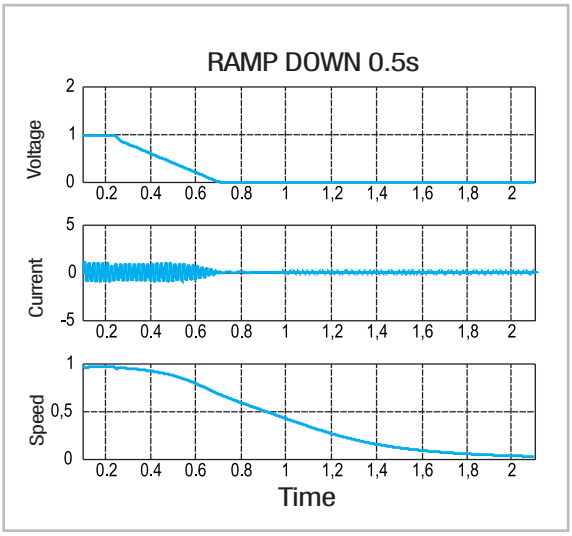
ASTAT S soft start



Direct-on-line stop



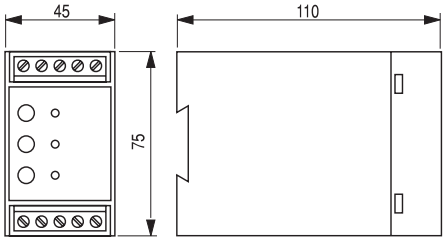
ASTAT S soft stop



Dimensional drawings

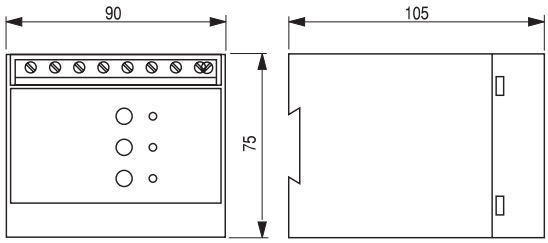
Small soft starter with integral by-pass

TYPE	Weight (kg)
QA12P008S	0.470
QA22P008S	0.470



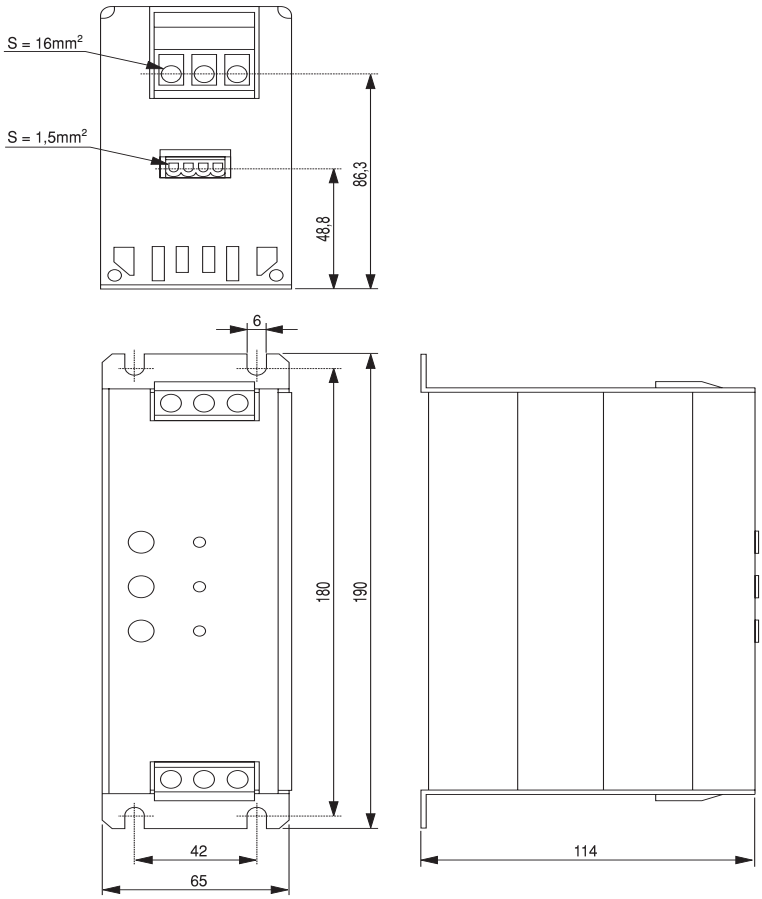
Dimensions in mm

TYPE	Weight (kg)
QA_2P017S	0.610
QA_2P022S	0.650
QA32P008S	0.650



Dimensions in mm

TYPE	Weight (kg)
QA_2P031S	1.370
QA_2P044S	1.400
QA_2P058S	1.400

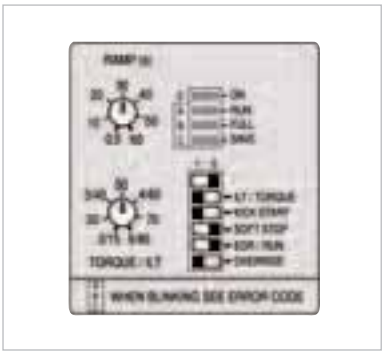


Dimensions in mm

Soft starters for 3ph motors up to 20 kW

- Solid state soft starter for 3ph AC motors up to 20kW
- Working voltage up to 500VAC
- With built-in analogue control panel
- Three phase - full wave control (6 thyristors)
- Excellent basic functions

Analogue control panel



Technical data

Ratings

3ph AC systems	up to 440V, + 10%, - 15% for types QS1_NA up to 500V, + 10%, - 15% for types QS2_NA
Frequency range	49 - 62 Hz

Control specifications

Control system	Digital system with microcontroller. Starting ramp with progressive increase in voltage and current limitation
Initial voltage (pedestal)	40% - 90% Un
Starting torque	15% - 80% Mdir.start
Kick start	90% Un (80% Mdir.start), 400ms
Motor current (Im)	0.5 to 1 Ir (nominal ASTAT)
Current limitation	2 to 5 x Ir
Acceleration ramp time	0.5 to 60 s
Energy savings	Output voltage reduction according to power factor
Override	Fixed output voltage permanently equal to supply voltage
Soft stop time	Max. 2 x t acceleration time

Operation

External control	Start - Stop
Acceleration phase	Adjustable time
Permanent phase (choice)	Energy savings / Override
Stop phase (choice)	Power cutt-off / Ramp

Inputs / Outputs

Input	Two optical couplings for Start/Stop
Output	One relay either Run or End of ramp (1NO)

Protections

Current limit	Adjustable from 2 to 5 Ir
Loss on input phase	Trip at 3 sec.
Thyristor short-circuit	Trip at 200 ms
Loss on output phase	Trip at 3 sec.
Supply frequency error	Will not start if f < 4a8Hz or f > 62Hz
Error (CPU)	60ms

Order codes ● page D.73
Diagrams ● page D.74
Dimensions ● page D.76

Technical data *(continued)*

Ambient conditions

Temperature	0 to +55°C (derate output current by 1.5% / °C above 45°C)
Relative humidity	95% without condensation
Maximum altitude	3000 m (derate output current by 1% / 100 m above 1000 m)
Mounting position	Vertical

Description of the terminals

1L1, 3L2, 5L3	Power supply (max. 440V or 500V depending type)
2T1, 4T2, 6T3	Outputs to motor
A1/A2, B1/B2	Command supply inputsa (110/120V - 220/240V AC)
11, 14	Internal relay output Run / End of ramp (1NO)
1, 57	Run command input
2, 57	Stop command input

Output contacts specifications

Maximum usage voltage		380V CA
Thermal current Ith		8A
Usage specifications		
	AC15	220V / 3A - 380V / 1A
	DC15	Max. 30V / 3.5A

Order codes

IEC ratings

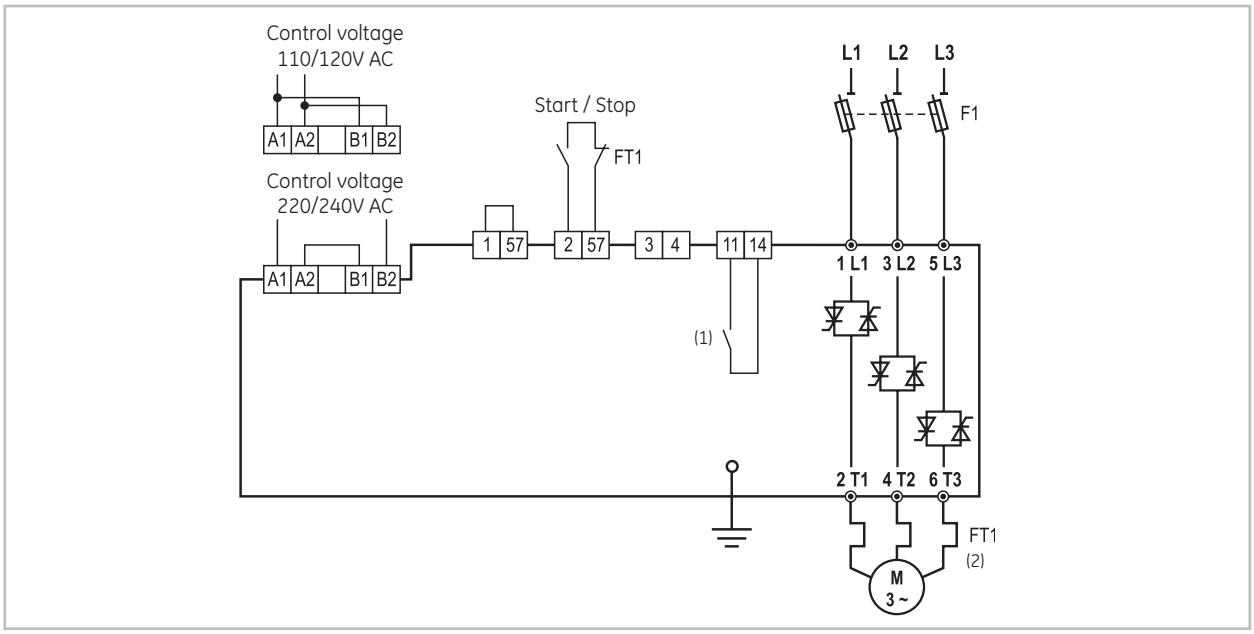
	Current rating Ir	Maximum starting current	Light duty (3 x Ir, 30sec.)				Heavy duty (4.5 x Ir, 30sec.)				Cooling convection	Cat. No.	Ref. no.
			220V 240V	380V 415V	440V	480V 500V	220V 240V	380V 415V	440V	480V 500V			
	A	A	kW	kW	kW	kW	kW	kW	kW	kW			
Input voltage 220 - 440 VCA + 10%, -15% 48 < f (Hz)< 62	5	25	1.1	2.2	2.2		1.1	2.2	2.2		Natural	**QS1BNA**	120460
	9	45	2.2	4	4		2.2	4	4		Natural	**QS1DNA**	120462
	12	60	3	5.5	6.3		3	5.5	6.3		Natural	**QS1FNA**	120464
	16	80	4	7.5	7.5		3.7	6.3	7.5		Natural	**QS1GNA**	120466
	22	110	5.5	11	11		5.5	11	11		Natural	**QS1HNA**	120468
	34	170	7.5	15	18.5		7.5	15	17		Natural	**QS1INA**	120470
Input voltage 220 - 500 VCA + 10%, -15% 48 < f (Hz)< 62	5	25	1.1	2.2	2.2	3	1.1	2.2	2.2	3	Natural	**QS2BNA**	120461
	9	45	2.2	4	4	5.5	2.2	4	4	5.5	Natural	**QS2DNA**	120463
	12	60	3	5.5	6.3	7.5	3	5.5	6.3	7.5	Natural	**QS2FNA**	120465
	16	80	4	7.5	7.5	10	3.7	6.3	7.5	10	Natural	**QS2GNA**	120467
	22	110	5.5	10	11	13	5.5	10	11	13	Natural	**QS2HNA**	120469
	34	170	7.5	15	18.5	20	7.5	15	15	20	Natural	**QS2INA**	120471

UL ratings

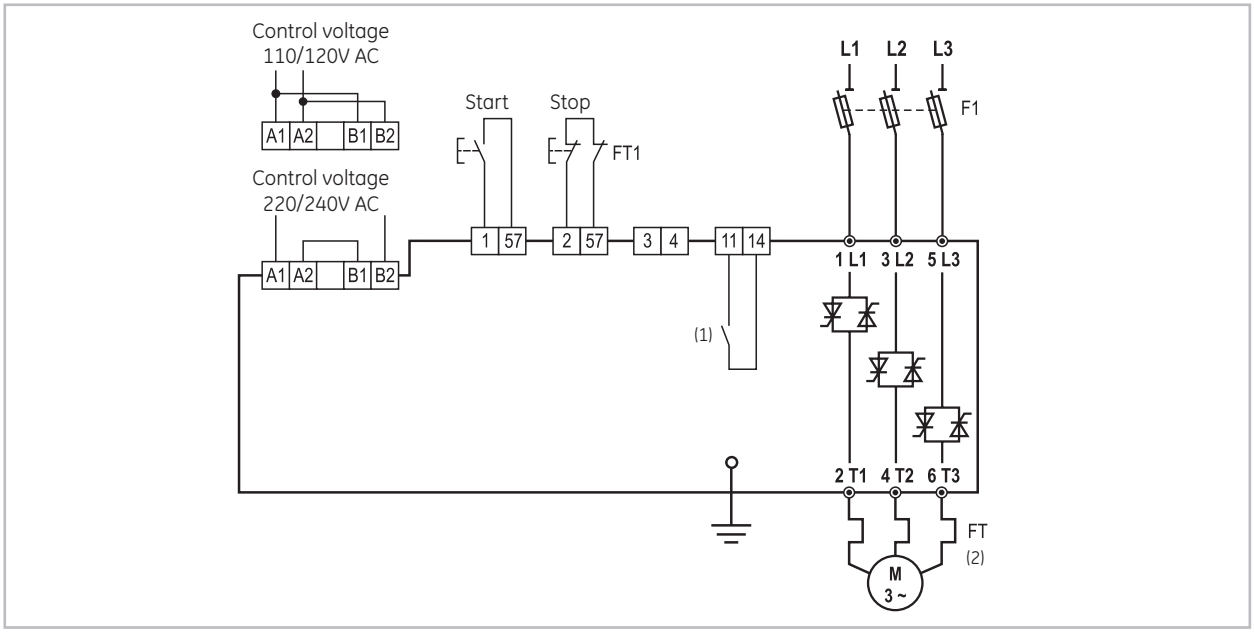
	Current rating Ir	Maximum starting current	Light duty (3 x Ir, 30sec.)			Heavy duty (4.5 x Ir, 30sec.)			Cooling convection	Cat. No.	Ref. no
			200V	230V	460V	200V	230V	460V			
	A	A	Hp	Hp	Hp	Hp	Hp	Hp			
Input voltage 200 - 230 V	5	25	1	1		1	1		Natural	**QS1BNA**	120460
	9	45	2	2		2	2		Natural	**QS1DNA**	120462
	12	60	3	3		3	3		Natural	**QS1FNA**	120464
	16	80	3	5		3	5		Natural	**QS1GNA**	120466
	22	110	5	7.5		5	7.5		Natural	**QS1HNA**	120468
	34	170	10	10		7.5	7.5		Natural	**QS1INA**	120470
Input voltage 200 - 460 V	5	25	1	1	3	1	1	3	Natural	**QS2BNA**	120461
	9	45	2	2	5	2	2	5	Natural	**QS2DNA**	120463
	12	60	3	3	7.5	3	3	7.5	Natural	**QS2FNA**	120465
	16	80	3	5	10	3	5	10	Natural	**QS2GNA**	120467
	22	110	5	7.5	15	5	7.5	15	Natural	**QS2HNA**	120469
	34	170	10	10	25	7.5	7.5	20	Natural	**QS2INA**	120471

Diagrams

Control by permanent command

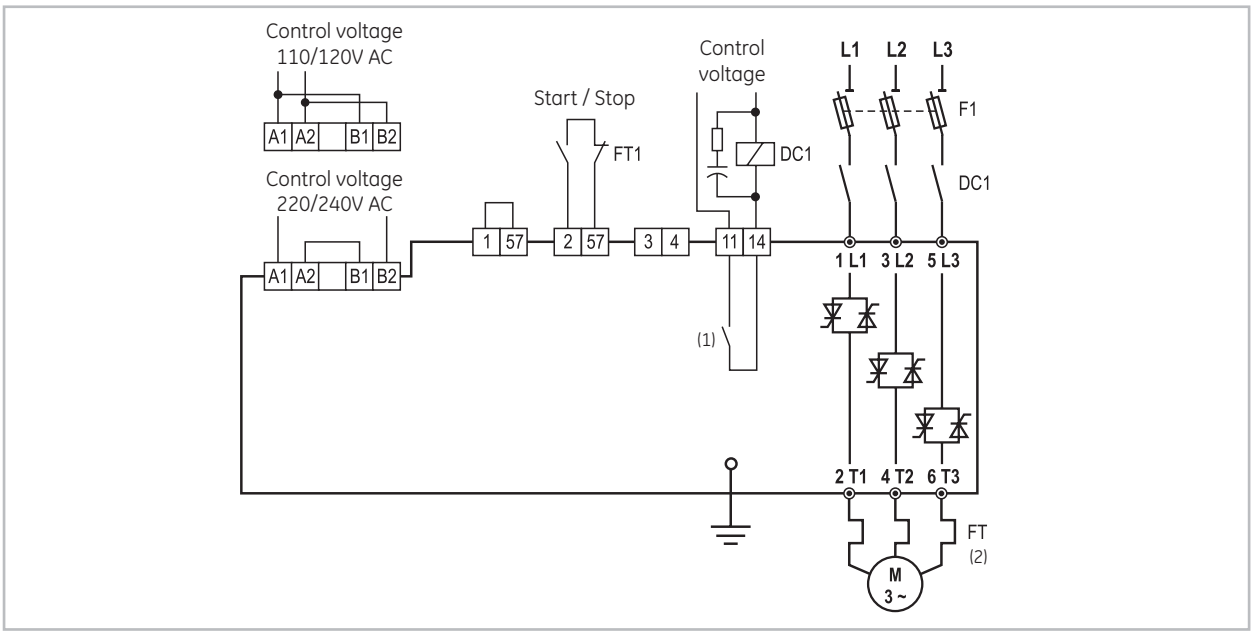


Control by push-buttons

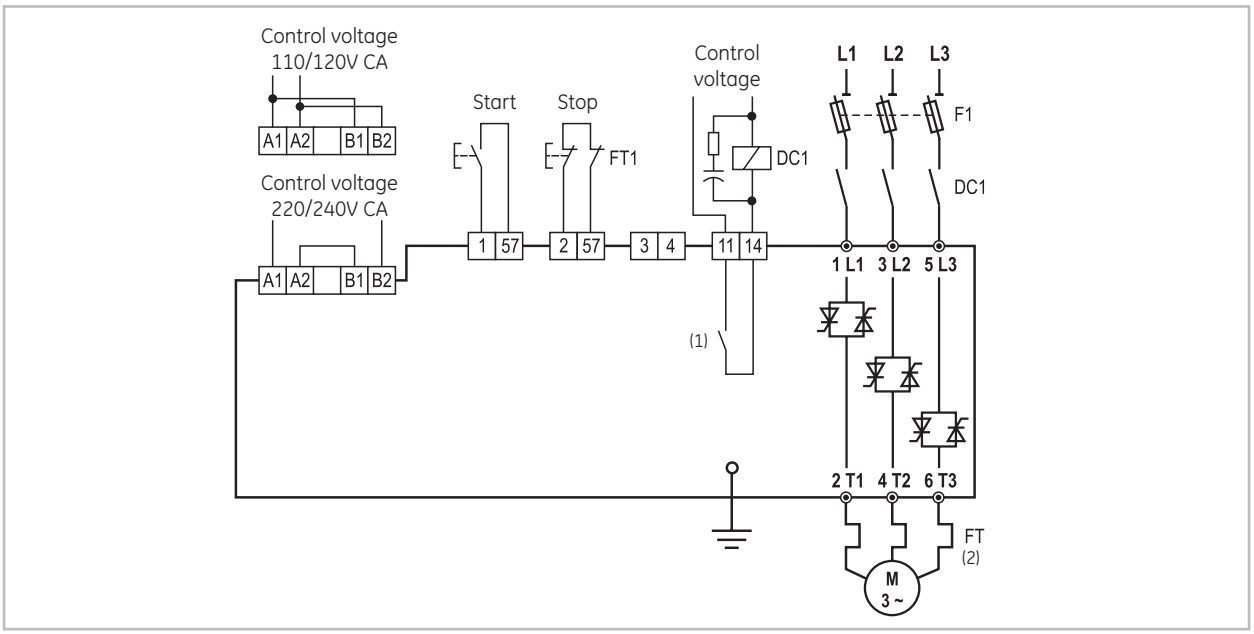


(1) These contacts allow for direct action on contactors up to type CL10 at 220 AC.
See Usage specifications to determine the necessity of an auxiliary relay.
(2) The ASTAT SD has no overload function, so always use an external overload relay to protect the motor

Permanent command with line contactor



Pulse function with line contactor



(1) These contacts allow for direct action on contactors up to type CL10 at 220 AC.
See Usage specifications to determine the necessity of an auxiliary relay.
(2): Use thermal relay if required by local rules, selecting it according to motor current

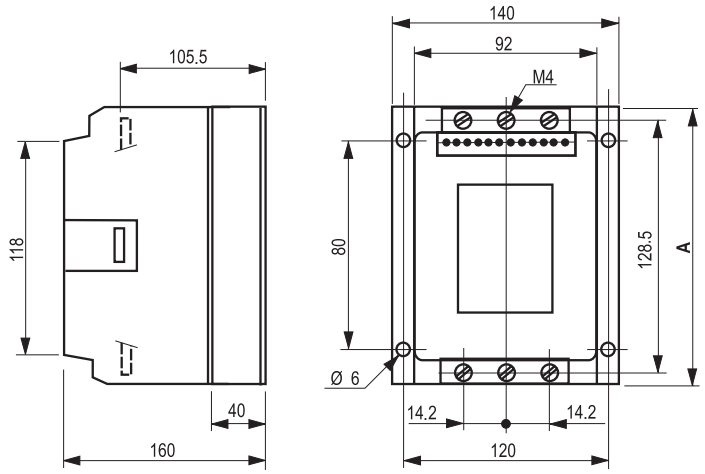
Data power circuit

ASTAT SD	Total losses	Contactor DC1	aM Fuses	Semiconductor fuses		
				Jean Müller	Jean Müller	Typower Silca 680V ~
	W	Type	A	Type	Ref. No.	Bussmann Type
QS_ BNA	17	CL00	12	S00C+/üF01/32A/690V	R5082953	Size = 00, In = 32A
QS_ DNA	31	CL00	16	S00C+/üF01/32A/690V	R5082953	Size = 00, In = 32A
QS_ FNA	37	CL01	20	S00C+/üF01/40A/690V	R5083453	Size = 00, In = 40A
QS_ GNA	49	CL02	25	S00C+/üF01/50A/690V	R5083553	Size = 00, In = 50A
QS_ HNA	75	CL04	32	S00C+/üF01/80A/690V	R5084153	Size = 00, In = 80A
QS_ I NA	86	CL45	63	S1ü01/110/100A/690V	R1084321	Size = 00, In = 100A

Coordination type 1

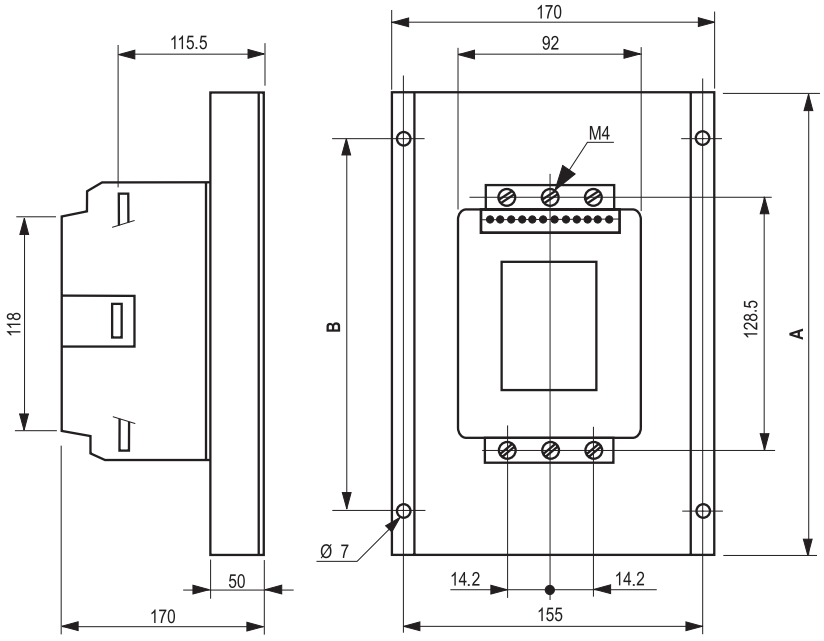
Dimensional drawings

Soft starters for 3ph motors up to 20 kW



TYPE	A	Weight (kg)
QS_BNA	150	2.1
QS_DNA	150	2.1
QS_FNA	180	2.2
QS_GNA	180	2.2

Dimensions in mm



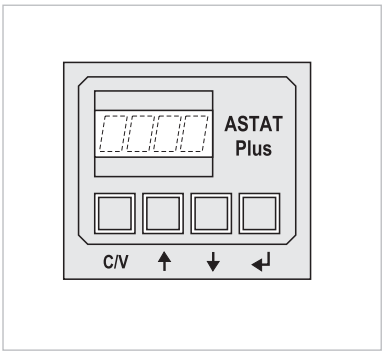
TYPE	A	B	Weight (kg)
QS_HNA	200	160	2.9
QS_DNA	250	200	3.4

Dimensions in mm

Soft starters for 3ph motors up to 850 kW

- Solid state soft starter for 3ph AC motors up to 850 kW
- Three pase - full wave control (6 thyristors)
- Working voltage up to 500V
- Built-in digital operation control panel
- Built-in ASCII and Modbus RTU communications
- Optional ProfibusDP and DeviceNet external communication modules
- High end features and functions

Digital control panel



Technical data

Ratings

3ph AC systems	Up to 440V, +10%, -15% for Cat. No. QC1_DP Up to 500 V, +10%, -15% for Cat. No. QC2_DP
Frecuency range (50-60Hz)	Control range of 45 - 65 Hz

Control specifications

Control system	Digital system with microcontroller Starting ramp with progressive increase in voltage and current limitation
Initial voltage (pedestal)	30%-95% Un
Starting torque	10% - 90% Mdirect start
Kick start	95% Un (90% Mdir.start), adjustable 0 to 999ms.
Motor current (Im)	0.4 to 1.2 Ir (rated ASTAT current)
Tiempo rampa aceleración	1 to 99s (types: standard or linear ramp up)
Energy savings	Output voltage reduction according to power factor
Override	Fixed output voltage permanently equal to supply voltage
Bypass	Direct control of a bypass contactor
Deceleration ramp time	1 to 120s (1s to 99s in secondary ramp) Modes: coast to stop, soft stop, pump control or linear ramp down
DC braking	0 to 99s ; 0.5 to 2.5 Ir
Slow speed	Forward: 7% or 14% nominal speed Reverse: 20% nominal speed
Retry	0 to 4 attemps, and 1to 99 sec. retry time
Monitoring	Motor current, line voltage, power, power factor and elapsed time

Order codes ● page D.80
I/O Terminal specifications ● page D.81
I/O wiring ● page D.82
Thermal characteristics ● page D.83
Diagrams ● page D.84
Dimensions ● page D.88

Running

External control	Start - Stop
Acceleration phase	Adjustable time / Pump control
Permanent phase	Energy savings / Override
Stop phase	Power cut-off / Ramp / DC braking / Pump control

Inputs / Outputs

Imput	4 digital optocoupled 2 fixed (Start, Stop), and 2 programmable (I3, I4) 1 analogue 0-5VDC for tachogenerator input feedback 2 inputs for motor thermistor
Output	3 programmable relays (1r changeover, 2r, 3r) 1 analogue 0-10V DC output for current metering

Communications

	ASCII and Modbus RTU as standard
	Profibus DP and DeviceNet as option external modules

Protections

Current limit	Adjustable from 1xIn to 7xIn
Overload	Class IEC 10 and 20 (selectable) Class NEMA 10, 20 and 30 (selectable) OFF desactivado
Cool-down time after overload trip	300 s for reset
Loss on input phase	Trip at 3 s
Thyristor shortcircuit	Trip at 200 ms
Heatsink overheating	Trip at 200 ms
Motor thermistor	Trip at 200 ms
Loss on output phase	Trip at 3s
Stalled rotor	Trip at 200 ms
Supply frequency error	Si f < 45Hz ó f > 65 Hz
Overcurrent	100 to 150% In; trip time adjustable from 0 to 99s
Undercurrent	0 to 99% In; trip time adjustable from 0 to 99s
Overvoltage	100% to 130% Un; trip time adjustable from 0 to 99s
Undervoltage	0 to 50% Un; trip time adjustable from 0 to 99s
Error (CPU)	60ms
Memory	4 former errors
Long start time	2 x ta (ta= acceleration ramp time)
Long slow speed time	120s

Ambient conditions

Temperature	0 to +55º C (derate output current by 1.5% /ºC above 40ºC)
Relative humidity	95% without condensation
Maximum altitude	3000 m (derate output current by 1%/100m above 1000m)
Mounting position	Vertical
Protection degree	IP 00, (UL open)

Standards

CE, cUL, UL	CE conforming IEC 947-4-2
	UL, cUL conforming UL 508
Conducted and radiated emissions	Conforming IEC 947-4-2, Class A
Electrostatic discharges	Conforming IEC 1000-4-2, level 3
Radioelectric interferences	Conforming IEC 1000-4-6, level 3 and to IEC 1000-4-3, level 3
Inmunity to fast trasients	Conforming IEC 1000-4-4, level 3
Inmunity to surge voltage	Conforming IEC 1000-4-5, level 3

Soft starters for AC motors up to 850 kW - Order codes

IEC ratings

	Max. current rating Ir	Max. starting current	Light duty (Class 10)					Heavy duty (Class 20)					Cooling convection	Cat. No.	Ref. no.
			Current rating Ir	220V 240V	380V 415V	440V	480V 500V	Current rating Ir	220V 240V	380V 415V	440V	480V 500V			
	A	A	A	kW	kW	kW	kW	A	kW	kW	kW	kW			
Input voltage 220- 440V	21.8	63	17	4	7.5	7.5	-	14	3	5.5	7.5	-	natural	QC1FDP	129728
+ 10%, -15%	26.5	76.5	21	5.5	11	11	-	17	4	7.5	7.5	-	natural	QC1GDP	129730
45 < f (Hz)< 65	34.3	99	27	7.5	13	15	-	22	5.5	11	11	-	natural	QC1HDP	129732
	49.9	144	38	10	18.5	22	-	32	7.5	15	18.5	-	natural	QC1I DP	129734
	74.8	216	58	15	25	30	-	48	13	22	22	-	by fan	QC1JDP	129736
	98.2	283.5	75	22	37	45	-	63	15	30	37	-	by fan	QC1KDP	129738
	112.3	324	86	25	45	50	-	72	20	37	37	-	by fan	QC1LDP	129740
	163.8	472.5	126	37	63	75	-	105	30	55	55	-	by fan	QC1MDP	129742
	243.3	702	187	55	90	110	-	156	40	75	90	-	by fan	QC1NDP	129744
	374.4	1080	288	80	150	165	-	240	63	110	132	-	by fan	QC1QDP	129746
	491.4	1417.5	378	110	200	220	-	315	90	160	200	-	by fan	QC1RDP	129748
	577.2	1665	444	132	220	250	-	370	110	200	220	-	by fan	QC1SDP	129750
	741	2137.5	570	160	300	355	-	475	150	250	250	-	by fan	QC1TDP	129752
	951.6	2745	732	220	400	450	-	610	200	315	400	-	by fan	QC1UDP	129754
	1326	3825	1020	300	560	600	-	850	250	450	530	-	by fan	QC1VDP	129756
	1677	4837.5	1290	395	715	750	-	1075	355	600	670	-	by fan	QC1XDP	129758
Input voltage 220- 500V	21.8	63	17	4	7.5	7.5	11	14	3	5.5	7.5	7.5	natural	QC2FDP	129729
+ 10%, -15%	26.5	76.5	21	5.5	11	11	13	17	4	7.5	7.5	11	natural	QC2GDP	129731
45 < f (Hz)< 65	34.3	99	27	7.5	13	15	15	22	5.5	11	11	15	natural	QC2HDP	129733
	49.9	144	38	10	18.5	22	25	32	7.5	15	18.5	22	natural	QC2I DP	129735
	74.8	216	58	15	25	30	37	48	13	22	22	30	by fan	QC2JDP	129737
	98.2	283.5	75	22	37	45	45	63	15	30	37	37	by fan	QC2KDP	129739
	112.3	324	86	25	45	50	50	72	20	37	37	45	by fan	QC2LDP	129741
	163.8	472.5	126	37	63	75	80	105	30	55	55	75	by fan	QC2MDP	129743
	243.3	702	187	55	90	110	132	156	40	75	90	110	by fan	QC2NDP	129745
	374.4	1080	288	80	150	165	200	240	63	110	132	160	by fan	QC2QDP	129747
	491.4	1417.5	378	110	200	220	250	315	90	160	200	220	by fan	QC2RDP	129749
	577.2	1665	444	132	220	250	315	370	110	200	220	250	by fan	QC2SDP	129751
	741	2137.5	570	160	300	355	400	475	150	250	250	335	by fan	QC2TDP	129753
	951.6	2745	732	220	400	450	500	610	200	315	400	400	by fan	QC2UDP	129755
	1326	3825	1020	300	560	600	750	850	250	450	530	600	by fan	QC2VDP	129757
	1677	4837.5	1290	395	715	750	850	1075	355	600	670	750	by fan	QC2XDP	129759

UL ratings

	Current rating Ir	Max. starting current	Light duty (3 x Ir, 30 sec.)			Heavy duty (4.5 x Ir, 30 sec.)			Cooling convection	Cat. No.	Ref. no.
			200V	230V	460V	200V	230V	460V			
	A	A	Hp	Hp	Hp	Hp	Hp	Hp			
Input voltage 200- 230 V	14	70	3	3	-	3	3	-	natural	QC1FDP	129728
	17	85	3	3	-	3	3	-	natural	QC1GDP	129730
	22	110	5	7.5	-	5	7.5	-	natural	QC1HDP	129732
	34	170	10	10	-	7.5	7.5	-	natural	QC1I DP	129734
	48	240	15	15	-	10	15	-	by fan	QC1JDP	129736
	63	315	20	20	-	15	20	-	by fan	QC1KDP	129738
	72	360	20	25	-	20	20	-	by fan	QC1LDP	129740
	105	525	30	30	-	30	30	-	by fan	QC1MDP	129742
	156	780	50	60	-	40	50	-	by fan	QC1NDP	129744
	240	1200	75	75	-	60	75	-	by fan	QC1QDP	129746
	315	1575	100	125	-	75	100	-	by fan	QC1RDP	129748
	370	1850	125	150	-	100	125	-	by fan	QC1SDP	129750
	500	2500	150	200	-	150	150	-	by fan	QC1TDP	129752
	630	3150	200	250	-	200	200	-	by fan	QC1UDP	129754
	850	4250	300	350	-	250	300	-	by fan	QC1VDP	129756
Input voltage 200- 460 V	14	70	3	3	7.5	3	3	7.5	natural	QC2FDP	129729
	17	85	3	3	10	3	3	10	natural	QC2GDP	129731
	22	110	5	7.5	15	5	7.5	15	natural	QC2HDP	129733
	34	170	10	10	25	7.5	7.5	20	natural	QC2I DP	129735
	48	240	15	15	30	10	15	30	by fan	QC2JDP	129737
	63	315	20	20	40	15	20	40	by fan	QC2KDP	129739
	72	360	20	25	50	20	20	40	by fan	QC2LDP	129741
	105	525	30	30	75	30	30	60	by fan	QC2MDP	129743
	156	780	50	60	125	40	50	100	by fan	QC2NDP	129745
	240	1200	75	75	200	60	75	150	by fan	QC2QDP	129747
	315	1575	100	125	250	75	100	200	by fan	QC2RDP	129749
	370	1850	125	150	300	100	125	250	by fan	QC2SDP	129751
	500	2500	150	200	400	150	150	350	by fan	QC2TDP	129753
	630	3150	200	250	500	200	200	400	by fan	QC2UDP	129755
	850	4250	300	350	700	250	300	600	by fan	QC2VDP	129757

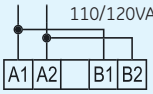
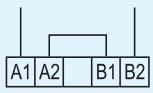
Ambient conditions are in accordance with the following ranges and maximum values:
- Operating temperature.....0 to +55ºC
- Relative humidity (without condensation).....95%
- Maximum altitude.....3000 m

Reduce usage intensity with 1.5% / ºC from 40ºC and 1% / 100 m from 1000 m.

Optional external modules	Device Net communications module	QCPDNT	129768
	Profi bus DP communications module	QCPPDP	129769

I/O terminal board specifications

Power I/O terminals

Terminals	Function	Description
1L1, 3L2, 5L3	Mains input	3ph input voltage according ASTAT Plus voltage
2T1, 4T2, 6T3	Motor output	Output terminals to 3ph AC motor
A1, A2, B1, B2	Control voltage	Input control voltage 110/120VAC, +10%, -15%  220/240VAC, +10%, -15% 

Digital inputs

57	Common for digital inputs	This is a common terminal for the digital input terminals specified below
1	Run	Run order. Command signal may be provided by one NO dry momentary contact to terminals 1 and 57
2	Stop	Stop order. Command signal may be provided by one NC dry momentary contact to terminals 2 and 57 NOTE: Run/Stop permanent command is allowed linking 1-57 and using one dry NO contact to 2-57 terminals
3 **4**	Programmable input I3 Programmable input I4	These two inputs are programmable. Can be assigned to the following internal functions: - soft stop - DC brake - linear ramp - pump control - slow speed control - dual ramp selection - kick start - reverse slow speed - by-pass function - override - local / remote control Command signal should be provided by one NC dry contact to terminals 57-3 or terminals 57-4. By switching this contact ON/OFF it is possible to enable or disable the assigned function.

Digital outputs

11, 12, 14	Programmable relay 1r	11-12 = NC, 11-14 = NO dry contacts This relay can be assigned to several internal output functions. As default assigned to function RUN.
23, 24	Programmable relay 2r	23-24 = NO dry contact This relay can be assigned to several internal output functions. As default assigned to function EOR.
33, 34	Programmable relay 3r	33-34 = NO dry contact This relay can be assigned to several internal output functions. As default assigned to function DC BRAKE
		Common for all relay output contacts: Max. usage voltage: 380V AC (B300 - UL) Thermal current Ith: 8A AC-15: 220V / 3A, 380V / 1A DC-15: 30V max. / 3.5A
		Programmable relays can be assigned to following functions: - End of Ramp - RUN - DC brake - Slow speed - Fault - Undercurrent - Undervoltage - Overcurrent - Overvoltage

Analogue I/O

8	Analog input common (-)	This is a common terminal for the analogue input terminal 7 and analogue output terminal 9
7	TG feedback input (+)	0-5V analogue input for speed feedback. It should be provided by a DC tacho-generator coupled to motor. This speed feedback signal is required when the «linear ramp» function is used.
9	Current output (+)	0-10VDC analog output for current measurement purpose. Ir correspond to 2Vdc. Rated current is 2VDC. Load impedance 10kΩ or higher.

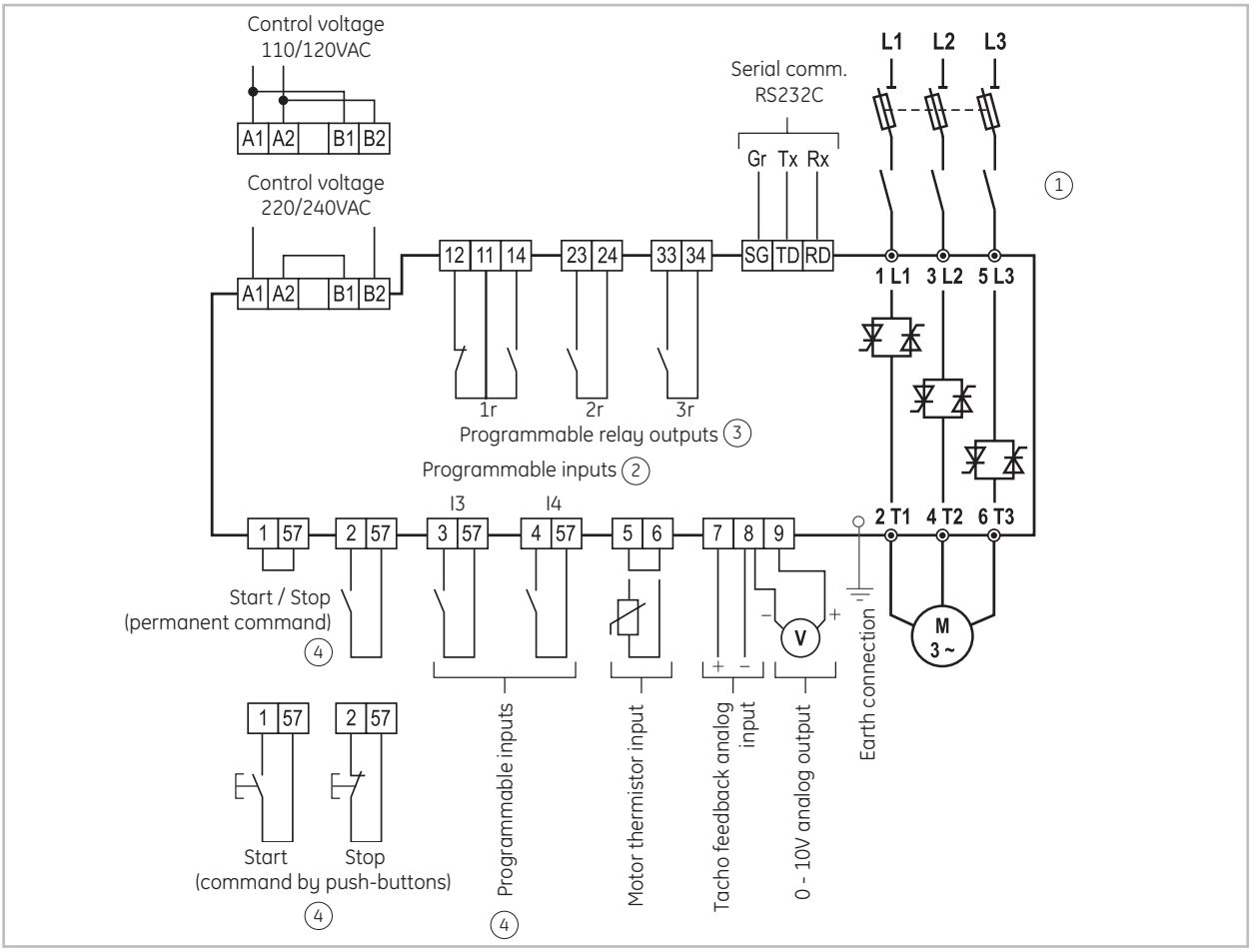
Motor thermistor terminals

5, 6	Motor thermistor input	This inputs allow a motor thermistor with a response value from 2.8 to 3.2kΩ, and a reset value from 0.75 to 1kΩ to control motor temperature. When the motor thermistor is not used, a link must be used in terminals 5-6.

Communications

SG, TD, RD	Gr, Tx, Rx data	- RS232C, 3 wires, half duplex. Maximum cable lengths 3m (10 feet) - Asynchronous data transmission, 9600 Bauds, 1 bit start, 8 bits data, 1 bit stop, no parity - Supported ASCII and ModbusRTU (selectable by the user) - Optional Device Net and Profibus DP external modules

I/O wiring



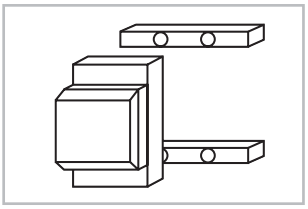
1. The islotaion contactor DC1, is not required to perform operation to the motor. Be aware however that DC1 provides galvanic isolation from the incoming line increasing the safety.

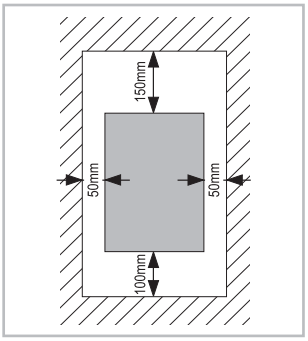
2. The programmable inputs I3, I4 are not assigned to any function by default. Check ASTATplus User Manual

3. The programmable relay outputs are assigned to the following functions as default:
   Relay 1r : RUN (RUN status)
   Relay 2r : EOR (End Of Ramp)
   Relay 3r : DCBR (DC braking control)

4. **Important:** Use dry contacts only

Installation





When installing the soft starter ASTATplus, keep the following points in mind:

☑ The soft starter should be installed vertically and should hang over a platform or bars. The vertical position is essential for proper cool air circulation.

☑ Ambient conditions are in accordance with the following ranges and maximum values:

- Operating temperature .....0 to +55°C
- Relative humidity (without condensation)..... 95%
- Maximum altitude.....3000m

Reduce usage intensity with 1.5% / °C from 40°C and 1% / 100 m from1000 m.

☑ Do not install the soft starter in environments containing explosive or flammable gases, or near important heat sources.

☑ The soft starter should be well ventilated, at least keeping clearance as indicated in illustration (left).

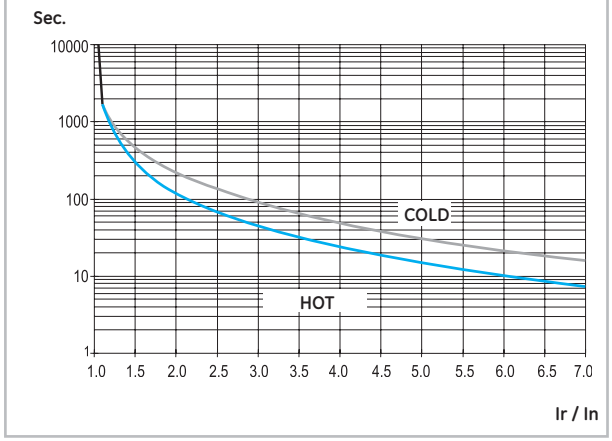
☑ When the soft starter is to be removed on a platform subject to strong vibrations, there should be an elastic base to protect the equipment.

Check User Manual for additional information

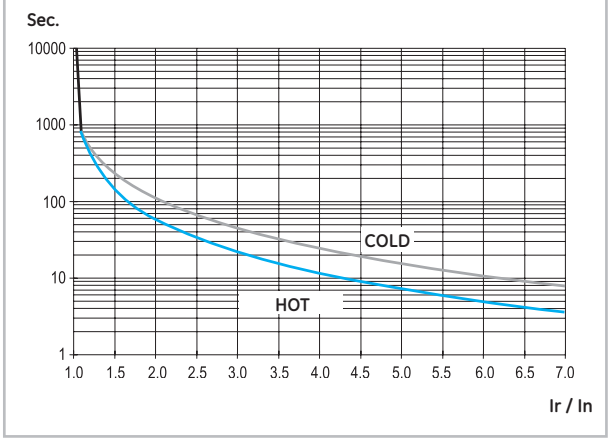
Thermal characteristics

The ASTATplus allows motor protection according IEC Class 10 or Class 20 and NEMA 10, 20 or 30, free selectable by parameter «o» (overload).

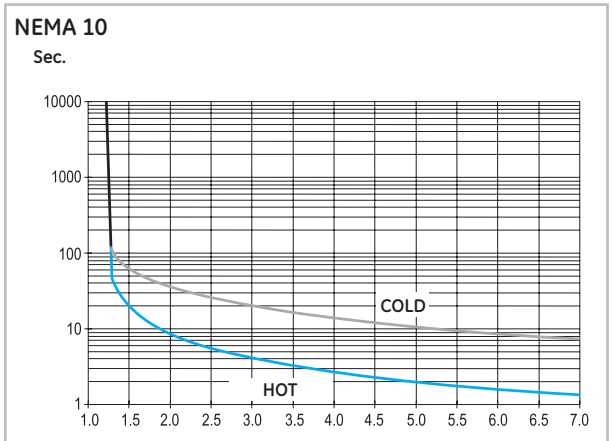
IEC Class 10



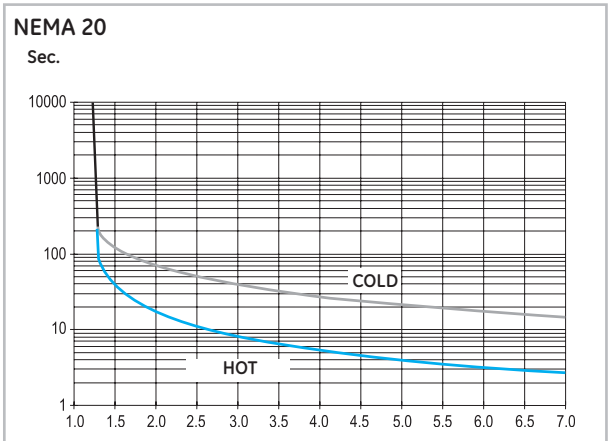
IEC Class 20



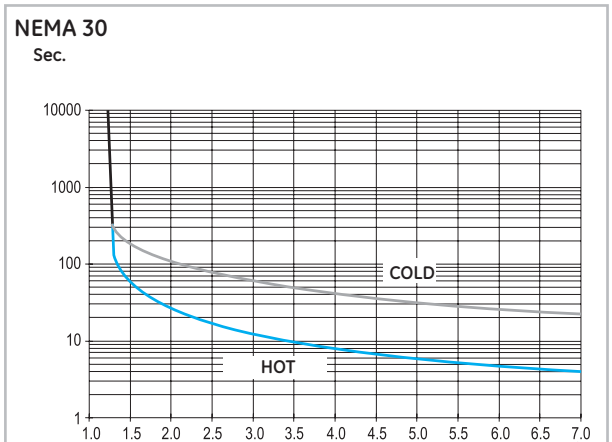
NEMA 10



NEMA 20



NEMA 30



Thermal memory

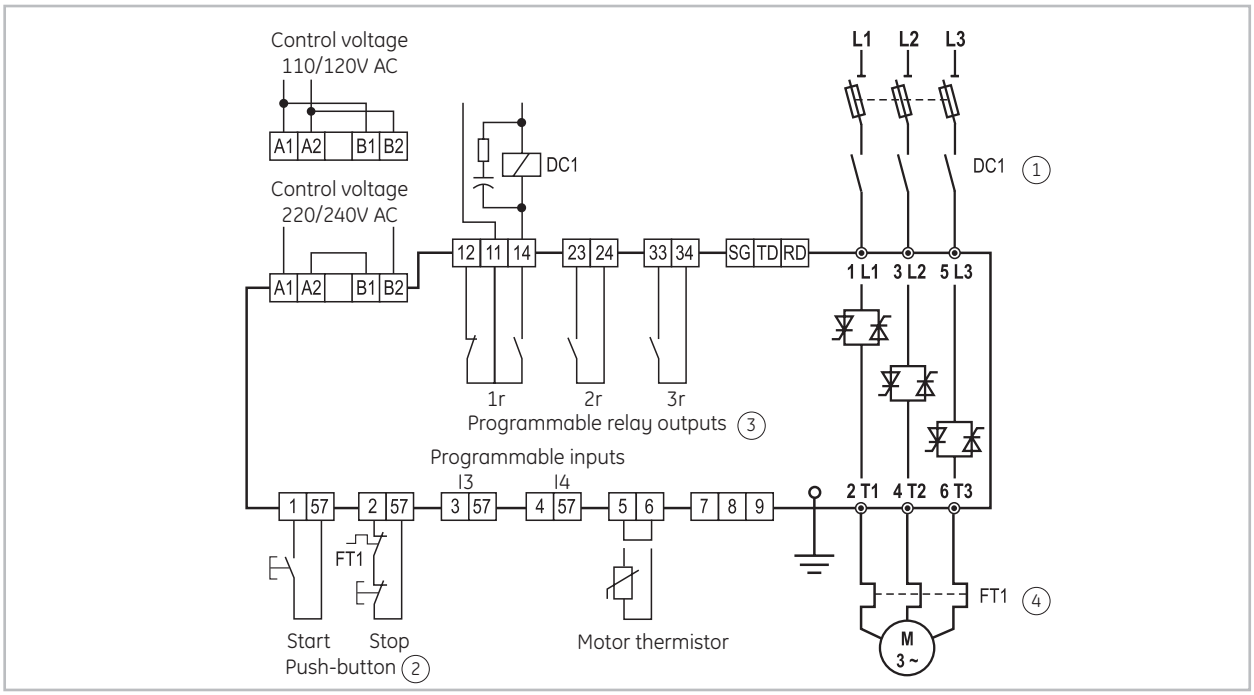
If the control voltage is not removed, the unit has a cool down characteristic, the time for cool down is 300 sec. after the overload trip.
If the control voltage is removed after tripping, wait at least 2 minutes before the unit can be restarted.

Operations per hour

Supposing a cycle T, with starting time of t1, running time of T-2t1 at rated current and OFF time of t1 sec. at least, the ASTAT Plus allows the following operations per hour.

Starting current	Operations/hour	Operations/hour
	Starting time t1=10 sec.	Starting time t1=20 sec.
2 Ir	180	90
3 Ir	160	60
4 Ir	30	10

Basic diagram by push-buttons



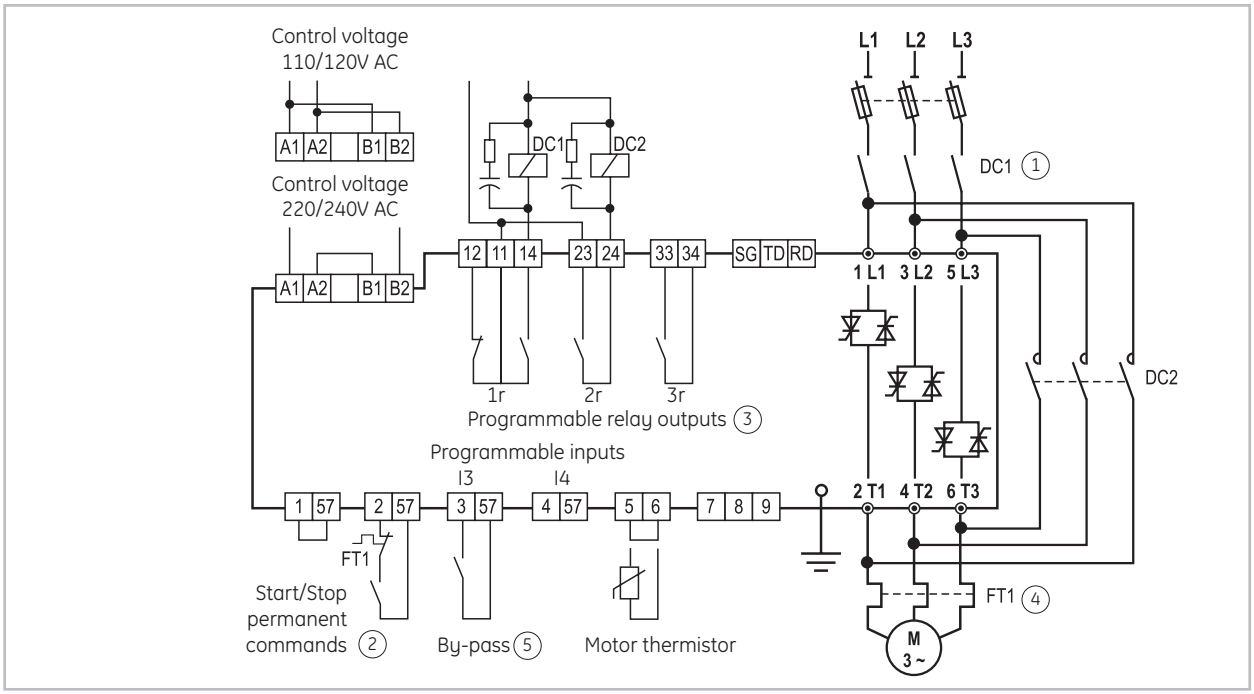
1 The isolation contactor DC1, is not required to perform operation to the motor. Be aware however that DC1 provides galvanic isolation from the incoming line increasing the safety.

2 In this example, Start and Stop command is enabled by push-buttons.
Permanent command is allowed as well, wiring 1, 2 and 57 terminals accordingly.

3 The output relays allow for a direct action on contactors according ratings specified.

4 The ASTATplus is provided with an electronic motor overload protection, which should be adequate protection for most of the applications.
Use an external overload protection if required by local codes or to protect the motor against current unbalance.

Basic diagram by permanent command with by-pass control



1 The isolation contactor DC1, is not required to perform operation to the motor. Be aware however that DC1 provides galvanic isolation from the incoming line increasing the safety.

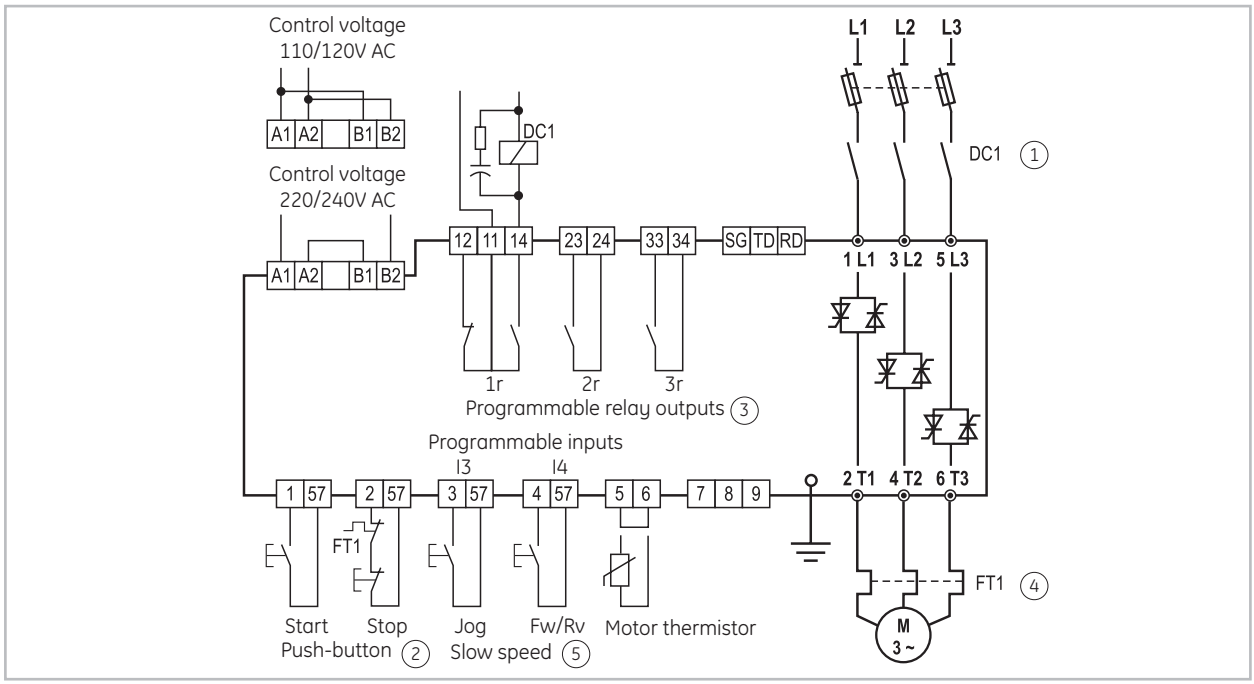
2 In this example, Start and Stop command is enabled by push-buttons.
Permanent command is allowed as well, wiring 1, 2 and 57 terminals accordingly.

3 The output relays allow for a direct action on contactors according ratings specified.

4 CAUTION:
In by-pass mode, an external overload relay protection must be used.

5 By-pass control is allowed using external contactor DC2 and setting function «zxxx» to ON.
As alternative by-pass can be controlled from the outside if «zxxx» is set to one programmable input.

Basic diagram with jog (slow speed) function



1 The isolation contactor DC1, is not required to perform operation to the motor. Be aware however that DC1 provides galvanic isolation from the incoming line increasing the safety.

2 In this example, Start and Stop command is enabled by push-buttons. Permanent command is allowed as well, wiring 1, 2 and 57 terminals accordingly.

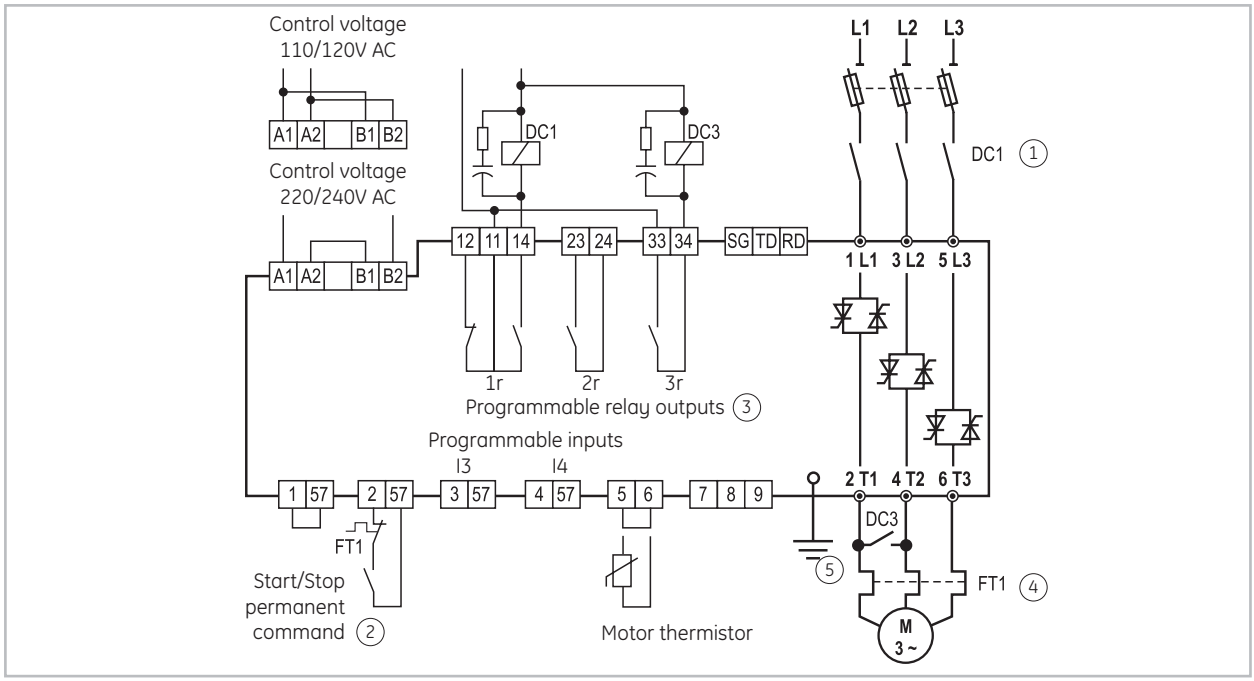
3 The output relays allow for direct action on contactors according ratings specified.

4 The ASTATplus is provided with an electronic motor overload protection, which should be adequate protection for most of the applications. Use an external overload protection if required by local codes or to protect the motor against current unbalance.

5 Slow speed for forward or reverse operation using programmable inputs I3, I4.

Jog (slow speed) function:
The slow speed function is enabled by setting «Jxxx» to I3.
For more information, check with ASTATplus User's Manual.

Basic diagram with DC brake injection



1 The isolation contactor DC1, is not required to perform operation to the motor. Be aware however that DC1 provides galvanic isolation from the incoming line increasing the safety.

2 In this example, Start and Stop command is enabled by push-buttons. Permanent command is allowed as well, wiring 1, 2 and 57 terminals accordingly.

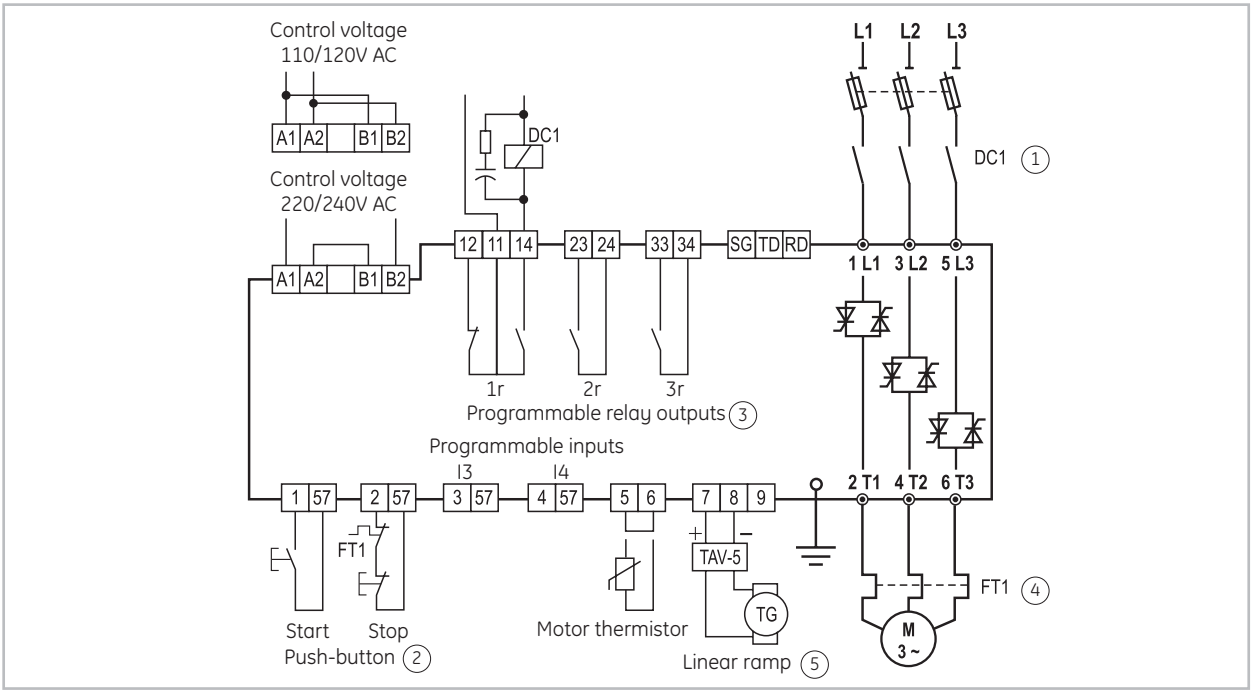
3 The output relays allow for direct action on contactors according ratings specified.

4 The ASTATplus is provided with an electronic motor overload protection, which should be adequate protection for most of the applications. Use an external overload protection if required by local codes or to protect the motor against current unbalance.

5 DC brake at stopping time is provided by the DC brake function and external contactor DC3.
CAUTION:
The 3 contacts of DC3 must be connected in parallel. Mandatory between 2T1 and 4T2 phases, otherwise a short-circuit can occur.

DC brake function
The DC brake function may be enabled by setting «Bxxx» to ON.
For more information, check with ASTATplus User's Manual.

Basic diagram with linear ramp



1 The isolation contactor DC1, is not required to perform operation to the motor. Be aware however that DC1 provides galvanic isolation from the incoming line increasing the safety.

2 In this example, Start and Stop command is enabled by push-buttons. Permanet command is allowed as well, wiring 1, 2 and 57 terminals accordingly.

3 The output relays allow for direct action on contactors according ratings specified.

4 The ASTATplus is provided with an electronic motor overload protection, which should be adequate protection for most of the applications.
Use an external overload protection if required by local codes or to protect the motor against current unbalance.

5 Linear ramp provided by «Dxxx» function. A tacho generator must be used as feedback.

Linear ramp function
The linear ramp function may be enabled by setting «Dxxx» to ON. In this case, linear ramp is independent of the load. This function needs the speed feedback provided by an external tacho generator.

For more information, check with ASTATplus User's Manual.

Fuses, contactors and supply wiring

IEC Class 10 ratings

Type	In	Total losses 100% In	Fuses aM (F1)	Fuses Jean Müller Type	Fuses Type BUSSMANN (Typower Sicu 660V~)		Control voltage		Contactor DC 1	Contactor DC 3 (2)	Conductor section
					Size	In	Fuse	Consumption			
	A	W	A				A	VA			mm²
QC_F DP	17	67	25	S00C+/üf01/40A/690V	00	40	1	18	CL02	CL02	4
QC_G DP	21	78	32	S00C+/üf01/50A/690V	00	50	1	18	CL03	CL03	4
QC_H DP	27	88	40	S00C+/üf01/80A/690V	00	80	1	18	CL04	CL03	6
QC_I DP	38	116	63	S1üf01/110/100A/690V	00	100	1	18	CL45	CL04	10
QC_J DP	58	208	80	S1üf01/110/125A/690V	00	125	2	55	CL07	CL45	16
QC_K DP	75	277	100	S1üf01/110/160A/690V	00	160	2	55	CL08	CL06	25
QC_L DP	86	302	125	S1üf01/110/200A/690V	00	200	2	55	CL09	CL06	35
QC_M DP	126	389	200	S1üf01/110/250A/690V	00	250	2	55	CK75	CL07	50
QC_N DP	187	719	250	M2üf02/315A/690V	00	315	2	78	CK08	CL10	95
QC_Q DP	288	1097	400	M3üf02/500A/690V	2	550	2	78	CK95	CK85	185
QC_R DP	378	1286	500	S3üf02/110/630A/690V	2	630	4	118	CK10	CK85	240
QC_S DP	444	1374	630	S3üf02/110/800A/690V	2	800	4	118	CK11	CK95	Busbar (1)
QC_T DP	570	2086	800	S3üf02/110/1000A/690V	3	1000	4	118	CK12	CK10	Busbar (1)
QC_U DP	732	2352	1000	S3üf02/110/1250A/690V	3	1250	4	248	CK12	CK10	Busbar (1)
QC_V DP	1020	3000	1250	S3üf02/110/800A/690V	-	-	4	248	CK13	CK11	Busbar (1)
QC_X DP	1290	3839	2x800	S3üf02/110/1000A/690V	-	-	4	248	CK13	CK12	Busbar (1)

IEC Class 20 ratings

Type	In	Total losses 100% In	Fuses aM (F1)	Fuses Jean Müller Type	Fuses Type BUSSMANN (Typower Sicu 660V~)		Control voltage		Contactor DC 1	Contactor DC 3 (2)	Conductor section
					Size	In	Fuse	Consumption			
	A	W	A				A	VA			mm²
QC_F DP	14	56	20	S00C+/üf01/40A/690V	00	40	1	18	CL01	CL01	4
QC_G DP	17	65	25	S00C+/üf01/50A/690V	00	50	1	18	CL02	CL02	4
QC_H DP	22	74	32	S00C+/üf01/80A/690V	00	80	1	18	CL03	CL03	4
QC_I DP	32	99	63	S1üf01/110/100A/690V	00	100	1	18	CL04	CL04	6
QC_J DP	48	178	80	S1üf01/110/125A/690V	00	125	2	55	CL06	CL04	10
QC_K DP	63	236	80	S1üf01/110/160A/690V	00	160	2	55	CL07	CL04	16
QC_L DP	72	257	100	S1üf01/110/200A/690V	00	200	2	55	CL08	CL06	25
QC_M DP	105	325	160	S1üf01/110/250A/690V	00	250	2	55	CL10	CL06	35
QC_N DP	156	591	200	M2üf02/315A/690V	00	315	2	78	CK75	CL07	70
QC_Q DP	240	901	315	M3üf02/500A/690V	2	550	2	78	CK85	CK75	120
QC_R DP	315	1063	400	S3üf02/110/630A/690V	2	630	4	118	CK95	CK85	185
QC_S DP	370	1136	500	S3üf02/110/800A/690V	2	800	4	118	CK10	CK85	240
QC_T DP	475	1721	630	S3üf02/110/1000A/690V	3	1000	4	118	CK11	CK95	Busbar (1)
QC_U DP	610	1950	800	S3üf02/110/1250A/690V	3	1250	4	248	CK12	CK10	Busbar (1)
QC_V DP	850	2491	1000	S3üf02/110/800A/690V	-	-	4	248	CK13	CK10	Busbar (1)
QC_X DP	1075	3168	1250	S3üf02/110/1000A/690V	-	-	4	248	CK13	CK12	Busbar (1)

(1) The DC1 contactor has to be selected for motors with nominal current equal to In
(2) The 3 contacts of DC3 must be connected in parallel
(3) As IEC 947

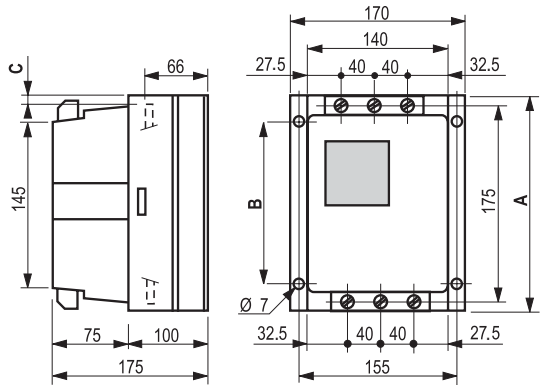
Branch circuit protection, UL

Type	Gould-Shawmut, semi-conductor fuses			Max. circuit breaker Size	Shortcircuit rating max. @480V		Comments
	Type A50QS (3)	Type A50P (4) RK5 & J	Max. fuse rating class		Non-combination	Combination	
QC_F DP	50A	-	30A	35A	25kA	5kA	(3) Suitable for use on a circuit capable of delivering not more than 100kA RMS symetrical amperes, for 208V, 240V and up to 480V maximum, when used with the semi-conductor fuse for shortcircuit protection. Listed with Gould Shawmut Form 101, type A5Qs or A50P (4) Suitable for use on a circuit capable of delivering not more than 65kA RMS symetrical amperes, for 208V, 240V and up to 480V maximum, when used with contactors (isolation or by-pass) that are also rated for 65kA withstand
QC_G DP	60A	-	35A	40A	25kA	5kA	
QC_H DP	80A	-	40A	50A	25kA	5kA	
QC_I DP	100A	-	70A	80A	25kA	5kA	
QC_J DP	150A	-	100A	125A	25kA	10kA	
QC_K DP	200A	-	125A	150A	25kA	10kA	
QC_L DP	225A	-	150A	150A	25kA	10kA	
QC_M DP	350A	-	200A	250A	25kA	10kA	
QC_N DP	450A	-	350A	350A	65kA	25kA	
QC_Q DP	600A	-	500A	600A	65kA	25kA	
QC_R DP	2X500A in parallel	-	600A	700A	65kA	25kA	
QC_S DP	2x600A in parallel	-	600A	800A	65kA	25kA	
QC_T DP	-	2x1000A in parallel	-	800A	65kA	30kA *2	
QC_U DP	-	2x1200A in parallel	-	1000A	65kA	30kA *2	
QC_V DP	-	2x1600A in parallel	-	1200A	65kA	65kA	

Note: When ASTAT Plus reduced voltage starters are used in conjunction with semi-conductor fuses, type 2 coordination to IEC 947-4 is attained. These fuses are recommended for best overall shortcircuit protection. The semi-conductor fuse specified may provide branch circuit protection. Refer to local applicable electrical codes.

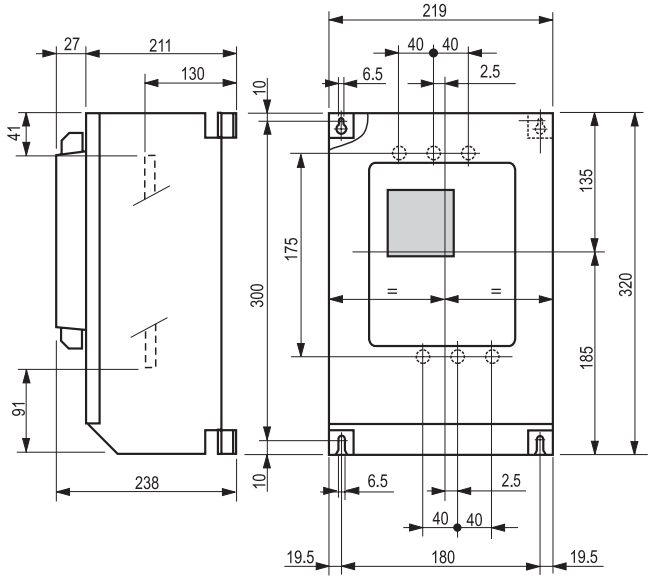
Dimensional drawings

Soft starters for 3ph motors up to 850 kW



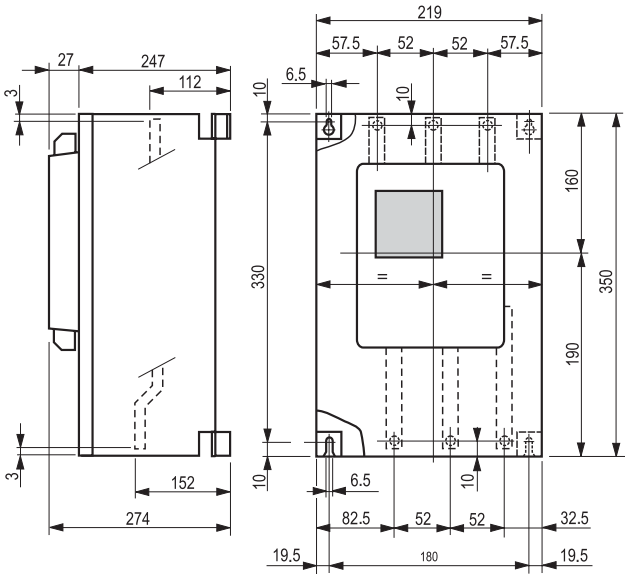
Type	A	B	C	Weight (kg)
QC_FDP	200	160	6	4.3
QC_GDP	200	160	6	4.3
QC_HDP	200	160	6	4.6
QC_I DP	250	200	31	4.6

Dimensions in mm



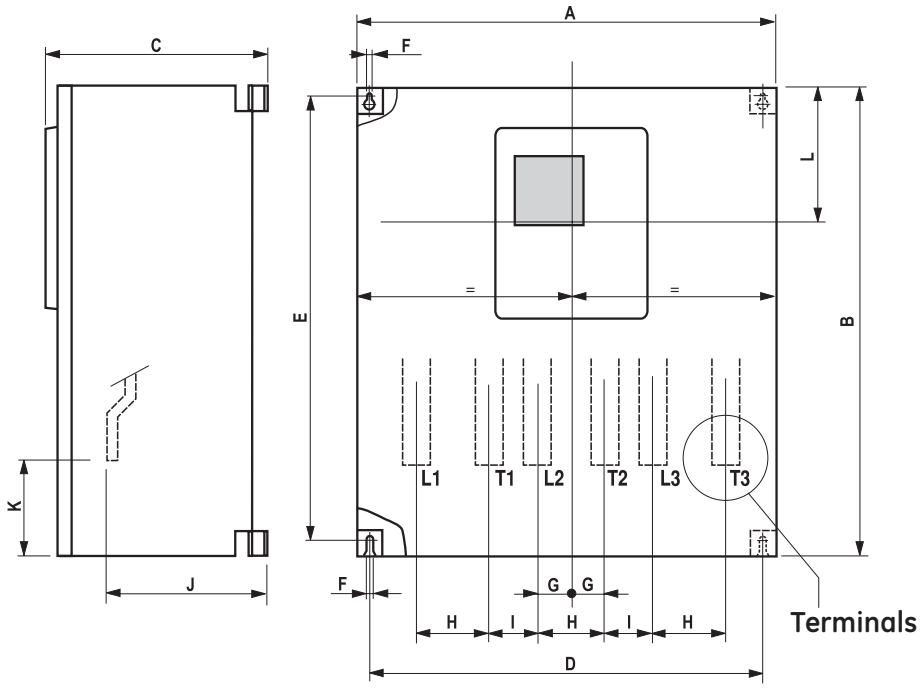
Type	Weight (kg)
QC_JDP	12.5
QC_KDP	12.5

Dimensions in mm



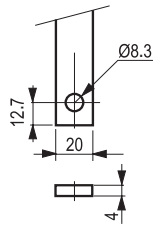
Type	Weight (kg)
QC_LDP	17
QC_MDP	17

Dimensions in mm

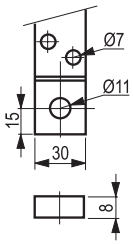


Type	A	B	C	D	E	F	G	H	I	J	K	L	Weight (kg)
QC_NDP	510	490	305	460	465	9	53	106	54	259	70	168	45
QC_QDP	510	490	305	460	465	9	53	106	54	259	70	168	45
QC_RDP	550	540	317	480	495	9	59	118	54	275	78	168	45
QC_SDP	550	540	317	480	495	9	59	118	54	275	78	168	45
QC_TDP	590	685	317	520	640	9	59	118	64.5	270	100	168	80
QC_UDP	790	850	402	700	805	11	60	120	120	352	120	175	80
QC_VDP	790	850	402	700	805	11	60	120	120	352	120	175	80
QC_XDP	810	1000	407	720	995	11	70	140	110	357	120	175	80

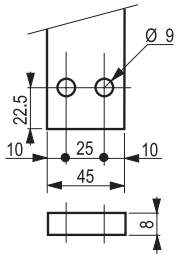
Terminals



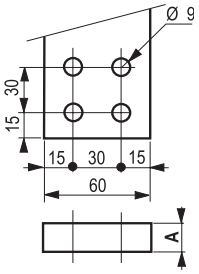
Type
QC_NDP
QC_QDP



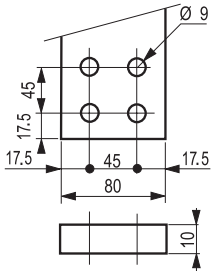
Type
QC_NDP
QC_QDP



Type
QC_TDP



Type	A
QS_UDP	6
QS_VDP	10



Type
QC_XDP

Dimensions in mm